【DESCRIPTION】

【Invention Title】
A NOZZLE STRUCTURE OF DISH WASHER

【Technical Field】
The present invention relates to a dish washer, and more particularly, to a nozzle structure of a dish washer that is designed to prevent backflow when water is supplied to a nozzle from a water guide.

【Background Art】
Generally, a dish washer is one of electronic appliances, which can wash dishes by removing garbage from the dishes using water sprayed through a spraying nozzle from a sump installed under a tub.
A typical dish washer includes a tub, a sump installed under the tub, a water guide connected to the sump, and an upper nozzle detachably coupled to the water guide from a center of the tub. The upper nozzle is located under a rack of the dish washer. The upper nozzle is detached from the water guide when the rack is extended outwardly, and it is coupled to the water guide again when the rack is retracted inwardly. When a door is closed after the rack is retracted, the rack is stably kept in the retracted position by the door, and the upper nozzle maintains the coupling with the water guide.
Between the upper nozzle and the water guide, a seal is disposed to prevent water leakage. Also, a check valve is installed in the upper nozzle to prevent backflow from the nozzle to the water guide.
The check valve includes a flap, a hinge for rotational motion of the flap, a support structure for supporting both end of the hinge, and a valve body defining a water passage to which the flap rotatably installed.
However, the flap, the hinge, and the support structure are separately fabricated and assembled into the upper nozzle, thereby complicating the assembly process.
Further, the manufacturing cost for the check valve increases. Furthermore, the productivity decreases in order to assemble all the separate parts of the check valve into the upper nozzle.

【Disclosure】
【Technical Problem】
Accordingly, the present invention is directed to a nozzle structure of a dish washer that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.
An object of the present invention is to provide a nozzle structure of a dish washer,

in which a structure of check valve is designed to simplify the assembly process of the check valve and reduce the manufacturing cost of the check valve.
Another object of the present invention is to provide a nozzle structure of a dish washer, in which a structure of check valve is designed to simplify the assembly process of the dish washer and reduce the manufacturing cost of the dish washer.

【Technical Solution】
To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, there is provided a nozzle structure of a dish washer, including: a nozzle holder; a gasket unit mounted on an end of the nozzle holder and including at least one inlet port; a flap support unit protruded from a front of the gasket unit; and a check valve flap rotatably coupled to the flap support unit.
According to another aspect of the present invention, there is provided a nozzle structure of a dish washer, including: a nozzle holder; a back cover coupled to an end of the nozzle holder; a gasket fitted to a front of the back cover; a gasket support coupled to a front of the gasket and including an upper inlet port, a lower inlet port, and a flap support unit formed between the upper inlet port and the lower inlet port; and a check valve flap coupled to the flap support unit to selectively open and close the lower inlet port.
According to a further another aspect of the present invention, there is provided a nozzle structure of a dish washer, including: a nozzle holder; a nozzle rotatably coupled to one end of the nozzle holder; a gasket unit mounted on the other end of the nozzle holder to prevent leakage of washing water; a check valve flap mounted on a front of the gasket unit; a flap support unit formed on a front of the gasket unit to support each side of the check valve flap; and a water guide to which the other end of the nozzle holder is detachably coupled.

【Advantageous Effects】
According to a nozzle structure of a dish washer of the present invention, the check valve can be easily and simply assembled and installed into the upper nozzle.
Further, the check valve can have simple structure owing to the nozzle structure, thereby reducing the manufacturing cost of the check valve.
Furthermore, though the check valve has simple structure, it can prevent leakage of washing water more securely.

【Description of Drawings】
FIG. 1 is a side sectional view of a dish washer equipped with a nozzle according to the present invention.
FIG. 2 is a cut-away view of a dish washer in which a water guide to be coupled with a nozzle is shown according to the present invention.

FIG. 3 is an exploded perspective view showing a coupling of a nozzle holder and a check valve according to the present invention.
FIG. 4 is a side view showing a check valve installed in a nozzle holder according to the present invention.

【Best Mode】
Hereinafter, preferred embodiments of the present invention will be described in detail with reference to accompanying drawings.
FIG. 1 is a side sectional view of a dish washer equipped with a nozzle according to the present invention.
Referring to FIG. 1, the dish washer 100 having a nozzle of the present invention includes an enclosing cabinet 111, a tub 110 installed in the cabinet 111 to define a dish washing chamber, a door 101 installed in front of the tub 110 to open and close the dish washing chamber, and a sump 170 installed on a bottom center of the tub 110 to store washing water.
Further, the dish washer 100 includes a pump 180 and a motor 190. The pump 180 is connected to the sump 170 to pump washing water contained in the sump 170, and the motor 190 is connected to the pump 180 from a lower side to drive the pump 180.
Further, the dish washer 100 includes a water guide 140 defining a flowing path of the washing water pumped out by the pump 180, a lower nozzle 160 mounted on a top of the sump 170 to spray the washing water upward in the tub 110, an upper nozzle 150 extending toward a center of the tub 110 from the water guide 140, and a top nozzle 155 mounted on the ceiling of the tub 110 to spray the washing water downward.
The upper nozzle 150 is rotatably mounted on an end of a nozzle holder 151 that is connected with the water guide 140. In the nozzle holder 151, a check valve (refer to 200 in FIG. 3) of the present invention is installed to prevent blackflow and leakage.
Further, the dish washer 100 includes an upper rack 120 mounted above the upper nozzle 150 and a lower rack 130 mounted between the lower nozzle 160 and the upper nozzle 150.
The upper rack 120 is supported on a rail (not shown) provided on an inner wall of the tub 110 and is slidable frontward and rearward. The nozzle holder 151 is fixed on a bottom of the upper rack 120, such that the nozzle holder 151 moves frontward and rearward together with the upper rack 120.
That is, the nozzle holder 151 is detached from the water guide 140 when the upper rack 120 is pulled out, and it is attached to the water guide 140 when the upper rack 120 is fully inserted into the tub 110.
An operation of the dish washer 100 will be described hereinafter.
A user first opens the door 101 and pulls the upper and/or lower racks 120 and/or 130 frontward. Then, dishes are loaded in the racks 120 and 130 and the door 101 is closed, after which the power is turned on to operate the dish washer 100.

When the dish washer 100 operates, washing water flows into the sump 170, after which the motor 190 operates to rotate an impeller (not shown) provided in the pump 180 shaft-connected to the motor 190. By the rotation of the impeller, the washing water is alternately pumped to the lower nozzle 160 and the water guide 140.

The washing water pumped to the water guide 140 is directed to the top nozzle 155 and the upper nozzle 150 and is then sprayed into the tub 110 to wash the dishes loaded in the upper and lower racks 120 and 130.

The top nozzle 155 is designed to spray the washing water downward while the upper nozzle 150 is designed to spray the washing water upward, thereby washing the dishes loaded in the upper rack 120.

The lower nozzle 160 is designed to spray the washing water upward to washing the dishes loaded in the lower rack 130. The upper nozzle 150 may be further provided at a bottom with spraying holes so that the washing water can be sprayed upward and downward, thereby simultaneously washing both sides of the dishes loaded in both the upper and lower racks 120 and 130.

During the washing operation, a filter (not shown) removes particles from the washing water collected in the sump 170. After the washing operation, a drain pump (not shown) is operated to discharge the washing water that is contaminated during the washing operation.

When the waste water is drained, new washing water is introduced into the sump 200 through a water supply hole and is then sprayed through the nozzles 150, 155 and 160 as in the above. By the new washing water, the dishes go through a rinsing operation.

After the rinsing operation is finished, the dishes go through a dry process, thereby completing the whole washing operation.

FIG. 2 is a cut-away view of a dish washer in which a water guide to be coupled with a nozzle is shown according to the present invention.

Referring to FIG. 2, the water guide 140, to which a check valve of the present invention is to be coupled, is U-shaped and disposed along an inner surface of the tub 110. The water guide 140 is formed with a nozzle holder connecting portion 143 at a middle for coupling with the nozzle holder 151. The nozzle holder connecting portion 143 includes support bosses 142 and a water outlet port 141. When assembled, the support bosses 142 couples with a check valve (refer to 200 in FIG. 3). The water outlet port 141 is formed under the support bosses 142 with a predetermined diameter and height.

That is, when assembled, the nozzle holder 151 is supported by the support bosses 142, and washing water is supplied to the nozzle holder 151 from the water guide 140 through the water outlet port 141.

FIG. 3 is an exploded perspective view showing a coupling of a nozzle holder and a check valve according to the present invention.

Referring to FIG. 3, when assembled, the check valve 200 couples to an end of the nozzle holder 151, and a back cover 300 couples to a back of the check valve 200 to prevent detachment of the check valve 200 from the nozzle holder 151.

The check valve 200 includes a gasket unit having a gasket support 220 and a gasket 210. The gasket support 220 is inserted into the nozzle holder 151 with its front facing the nozzle holder 151. The gasket 210 is made of rubber and fitted to a back of the gasket support 220 to prevent leakage.

The gasket support 220 includes an upper inlet port 230 and a lower inlet port 240 to introduce washing water into the nozzle holder 151. Since the water outlet port 141 of the water guide 140 is selectively coupled to the upper inlet port 230 and the lower inlet port 240, the inlet ports 230 and 240 may have the same diameter. The selective coupling between the water outlet port 141 and the inlet ports 230 and 240 will be fully described later.

The check valve 200 further includes a rubber flap 250 pivotably installed between the upper inlet port 230 and the lower inlet port 240. The flap 250 is sized to fully cover the lower inlet port 240. The flap 250 couples with flap support unit that are protruded from a front of the gasket support 220. The flap support unit includes flap support arms 260 having protrusions 261.

The flap support arms 260 face each other and are located a predetermined distance from each other to support both sides of the flap 250. The Protrusions 261 are inwardly extended from inner sides of the flap support arms 260 to face each other.

The flap 250 includes a protrusion receiving portion such as a coupling hole 251 defined in an upper end to receive the protrusions 261 of the flap support arms 260. The coupling hole 251 may be a through hole with a predetermined size. Alternatively, the protrusion receiving portion of the flap 250 may be coupling depressions defined in both upper sides to receive the protrusions 261. That is, the coupling depressions may be two in number and properly positioned to receive the protrusions 261.

Since the flap 250 can be pivotably fixed to the gasket support 220 by the flap support arms 260 and the coupling hole 251, an additional hinge pin is not required.

The lower end of the lower inlet port 240 is extended forward more than that of the upper inlet port 230. That is, the end of the lower inlet port 240 is angled with respect to the gasket support 220. Therefore, when the flap 250 closes the lower inlet port 240, the flap 250 is suspended at an angle to the vertical, such that the contact between the flap 250 and the lower inlet port 240 can be more securely maintained by the weight of the flap 250 without a gap. If the end of the lower inlet port 240 is not sloped, the lower inlet port 240 may not be securely closed by the flap 250. For example, if the dish washer 100 is placed on a sloped surface, a gap may be defined between the flap 250 and the lower inlet port 240 when the flap 250 closes the lower inlet port 240.

The back cover 300 includes a first hole 310 at an upper portion, a third hole 330 at a

lower portion, and a second hole 320 between the first and the second holes 310 and 330. The holes 310, 320, and 330 may have the same diameter.

When assembled, the first hole 310 couples with one of the support bosses 142 of the water guide 140, the second hole 320 communicates with the upper inlet port 230, and the third hole 330 communicates with the lower inlet port 240.

The nozzle holder 151 can be coupled to the water guide 140 at different heights. To couple the nozzle holder 151 to the water guide 140 at a relatively higher position, the first hole 310 is fitted to the higher of the support bosses 141, and therefore the water outlet port 141 of the water guide 140 communicates with the third hole 330 and the lower inlet port 240.

To couple the nozzle holder 151 to the water guide 140 at a relatively lower position, the first hole 310 is fitted to the lower of the support bosses 141, and therefore the water outlet port 141 of the water guide 140 communicates with the second hole 320 and the lower inlet port 230.

FIG. 4 is a side view showing a check valve installed in a nozzle holder according to the present invention.

Referring to FIG. 4, the check valve 200 is installed at an end of the nozzle holder 151, and the lower inlet port 240 communicates with the nozzle holder 151.

First, the coupling of the nozzle holder 151 to the water guide 140 at a relatively higher position will now be described.

The nozzle holder 151 is coupled to the water guide 140 with the lower inlet port 240 communicating with the water outlet port 141. Washing water flows from the water outlet port 141 to the lower inlet port 240, and pushes the flap 250 to rotate it about the flap support arms 260 in an upward direction. When the flap 250 is fully rotated by the washing water, the lower edge of the flap 250 makes contact with the inner wall of the nozzle holder 151 to prevent the washing air from reversely flowing toward the upper inlet port 230. Therefore, the washing water can flow from the water outlet port 141 to the nozzle holder 151 through the lower inlet port 240 without backflow through the upper inlet port 230.

The coupling of the nozzle holder 151 to the water guide 140 at a relatively lower position will now be described. The nozzle holder 151 is coupled to the water guide 140 with the upper inlet port 230 communicating with the water outlet port 141. Washing water flows from the water outlet port 141 to the nozzle holder 151 through the upper inlet port 230, and pushes down the flap 250 to close the lower inlet port 240. That is, the flow of the washing water presses the flap 250 against the lower inlet port 240 and thereby the lower inlet port 240 can be securely closed to prevent backflow therethrough. The washing water further flows from the nozzle holder 151 to the upper nozzle 130.

As described above, the flap 250 is rotatably coupled with the protrusions 261 of the flap support arms 260. When washing water is supplied from the water guide 140 to the nozzle holder 151, the position of the flap 250 is determined depending on which